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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,483	09/08/2003	Brian E. Curcio	END920000122US3 (IEN-10-5)	7494
26681 7590 07/17/2007 DRIGGS, HOGG & FRY CO. L.P.A. 38500 CHARDON ROAD DEPT. IEN WILLOUGHBY HILLS, OH 44094			EXAMINER OLSEN, ALLAN W	
			ART UNIT 1763	PAPER NUMBER
			MAIL DATE 07/17/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/657,483	Applicant(s) CURCIO ET AL.	
	Examiner Allan Olsen	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 15, 16 and 18-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 15, 16 and 18-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 17, 2007 has been entered.

Election/Restrictions

Claim 17 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Election was made **without** traverse in the reply filed on September 6, 2005.

Nonelected claims 13 and 14 have been cancelled.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7-10 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by European Patent Application EP 0 996 318 (hereinafter, Kataoka).

With reference to figure 3, Kataoka teaches a method of forming a core member by providing a dielectric substrate (41) and forming an electrically conductive coating (24) and/or (43) on at least one face thereof (fig. 3a). Kataoka teaches forming at least one opening through the substrate extending from one face to the other and through each conductive coating (figure 3b, 3c). Kataoka teaches providing an electrically conductive material (43) or (45) in the opening (fig. 3c or 3e). Kataoka teaches removing at least a portion of the surface of the conductive coating (24) on at least one face to thereby allow a nub of the conductive material to extend above the surface of said substrate (fig. 3f).

In paragraph [0071], Kataoka teaches the conductive materials (43) and (45) are formed by plating and the conductive coating (24) and/or (43) is/are removed by etching. In paragraphs [0032] and [0041], Kataoka teaches the conductive coating layer (24) may comprise, for example, Cu, Ag, Au, Pt, Zn, and Ni while conductive coating layer (43) preferably comprises Cu. In paragraph [0063], Kataoka teaches the insulating substrate (41) may comprise a composite material such as glass epoxy.

Claims 1, 3, 4, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,624,268 issued to Maeda et al. (hereinafter, Maeda).

With reference to figures 7-9, Maeda teaches a method of forming a core member by providing a dielectric substrate (3) and forming an electrically conductive

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coating (2). Maeda teaches forming at least one opening through the substrate extending from one face to the other and through each conductive coating (fig. 7). Maeda teaches providing an electrically conductive material (6) in the opening (fig. 8). Maeda teaches removing at least a portion of the surface of the conductive coating (2) on at least one face to thereby allow a nub of the conductive material to extend above the surface of said substrate (fig. 9).

At column 3, lines 43-62, Maeda teaches the conductive material is a filled thermoset or thermoplastic polymer. At column 5, lines 20-23, Maeda teaches that the opening is plated with a layer of gold (7). At column 3, lines 63-65, Maeda teaches the conductive coating is removed by etching.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2, 5, 6, 11, 15, 16 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of US Patent 6,388,204 issued to Lauffer et al. (hereinafter, Lauffer).

The above noted teachings of Maeda are herein relied upon. Additionally, it is noted that Maeda teaches using doctor blade method to fill the vias with an Ag-filled polymer. Maeda teaches curing the conductive resin after filling the vias. Maeda teaches removing excess conductive resin (column 3, lines 43-61).

Maeda does not teach using multiple passes to fill the vias. Maeda does not teach enhancing the flow of the conductive polymer by heating the conductive polymer. Maeda does not teach partially curing Ag-filled resin to between 20% and 80%. Maeda does not teach that the Ag-filled polymer used to fill the vias is an epoxy adhesive. Maeda does not teach making contact between a nub that is protruding from one substrate and a nub that is protruding from another substrate and bonding the nubs together by curing the conductive adhesive nub material. Maeda does not teach a copper layer having a thickness of 35-70 microns.

Lauffer teaches filling vias with an Ag-filled polymer that also functions as an epoxy adhesive. Lauffer teaches partially curing Ag-filled resin to between 20% and 80%. Lauffer teaches laminating layers by curing the conductive via fill while contacting a similar feature of another substrate.

Maeda does not teach that the Ag-filled polymer used to fill the vias is an epoxy adhesive. Maeda does not teach making contact between a nub that is protruding from one substrate and a nub that is protruding from another substrate and bonding the nubs

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together by curing the conductive adhesive nub material. Maeda does not teach a copper layer having a thickness of 35-70 microns.

It would have been obvious to one skilled in the art to heat the Ag-filled conductive resin to a temperature that would facilitate the filling of the vias. After filling the vias with the conductive material, it would have been obvious to one skilled in the art to partially cure the conductive material to prevent the material from flowing out of the vias. It would have been obvious to one skilled in the art to use as many passes as necessary to fill the through holes with the conductive fill material. It would have been obvious to use an adhesive agent as the conductive fill material because Lauffer teaches that this allows one to fabricate laminated structures in an advantageous manner. Specifically Lauffer states (column 1, lines 58-65):

The present invention makes possible laminate circuit structures being more robust and less costly. The present invention provides for reduced cost since copper plating of the composite structure is no longer required and plated through holes are not needed. Moreover, alignment of the various sub-elements is not as critical since the need to maintain a minimum through hole diameter to get copper plating solution through no longer exists.

Furthermore, Lauffer teaches the method is useful in fabricating a variety of structures, for example, at column 1, line 66- column 2, line 10, Lauffer teaches:

More particularly, the laminate circuit structure assembly of the present invention composes at least two modularized

circuitized plane subassemblies wherein each of the subassemblies comprise at least two planes having circuit traces disposed about an internal circuitized plane. The at least two planes each have an external surface and an internal surface. Dielectric material is located between the circuit traces and circuitized plane. At least one via is disposed within each subassembly for providing electrical communication between the planes having circuit traces and electrical connection to another of the subassemblies. The vias are filled with a bondable electrically conductive material.

Also, at column 2, lines 31 - 50:

The present invention also relates to a method for fabricating a laminate circuit structure assembly. The method comprises providing at least two modularized circuitized plane subassemblies wherein each of the subassemblies comprise at least two planes having circuit traces disposed about an internal circuitized plane. The planes having circuit traces each have an external surface and an internal surface. Dielectric material is located between the planes. At least one via is disposed within each subassembly for providing electrical communication between the planes having circuit traces and electrical connection to another of the subassemblies. The vias are filled with bondable electrically conductive material. Dielectric is also provided on each external surface of each plane having circuit traces and having a via filled with a bondable electrically conductive material. The bondable electrically conductive material in the dielectric is aligned with and contacts the bondable electrically conductive material in the via in the planes having circuit traces for providing electrical connection to another of the subassemblies.

It would have been obvious to one skilled in the art to use copper layer of 35 to 70 microns thick because these values corresponds to the thickness of copper in 1 oz and 2 oz Cu which are readily available and frequently used copper films.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Allan Olsen", with a stylized flourish at the end.

Allan Olsen
Primary Examiner
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